SCIENCE.

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COMMENT AND CRITICISM.

WE DESIRE TO OFFER to our readers from time to time discussions on questions of present educational interest by men of prominence in the teaching profession. The first of these discussions is printed in this issue, and deals with the question as to what industry can profitably be introduced into country schools. The contributors are Pres. Francis A. Walker of Boston, Charles H. Ham of Chicago, and Superintendent Samuel G. Love of Jamestown, N.Y. The question was put as to country schools because there are certain conditions peculiar to them. As a rule, they are not so carefully organized nor so well managed as city schools. Their resources are usually less, and their opportunities fewer, than those possessed by the schools of the town or the city. And in this one particular of the introduction of an element of industrial training, the country school is at a disadvantage. It is cut off from using many forms of industrial training that are at hand in the city; and on this and other accounts it merits separate consideration. It is to be borne in mind that industrial work can only find access to the schools in so far as it is educational. As manual or technical instruction, there is no room for it save in institutions created especially for it. The schools can, must, and will welcome it as an educational factor. Its theoretical value is conceded: it remains to solve the practical questions as to just how it can be introduced. What changes must be made to accommodate it? What re-adjustments and re-arrangements are necessary? These are pressing questions just now.

GEN. JAMES B. FRY, in a paper on compulsory education in the army, takes occasion to go at length into the subject of public-school education. In fact, this forms by far the larger portion of his pamphlet, the considerations relating to the army being relegated to a few pages at the end. General Fry's language is strong and direct, and he is very much opposed to compulsory education in particular and to the public-school system in general. His argument is, in brief, that compulsory education by the state involves a pernicious assumption of power, and that the state's expedients and processes necessarily call for official surveillance and intermeddling, which, to be effective, must be arbitrary and vexatious, and which are hostile to our institutions and to the feelings of self-reliance and personal independence born and bred in our people. It deprives parents of responsibility for their children, the writer contends, and does this at the expense of a part of the community; and, however high its pretensions, it cannot be free from the demoralization that results from giving alms by law.

We must confess that this seems to us very silly. General Fry appears to have fallen a victim to platitudes and that most curious cry of 'pauperizing the intellectual classes' which is now so often heard. To which of our 'institutions' is the public-school system hostile? We have an idea that it is the chiefest of them as well as their centre. This subject has been gone over so often that it is hardly worth while treating it again. But we could not resist the temptation of merely indicating how even so serious and well-meaning a writer as General Fry may be totally misled by words, when he does not pause to weigh carefully the ideas for which they stand.

WHY THE WALLS of the stomach and intestine are not themselves digested by their own fluids has for more than a hundred years been a mooted question in physiology. John Hunter, in a paper read before the Royal society in 1772, maintained that it was because these tissues were living, or, as he expressed it, "animals, or parts of animals, possessed of the living principle, when taken into the stomach, are not in the least affected by the powers of that viscus so long as the animal principle remains; hence it is that we find animals of various kinds living in the stomach, or even hatched and bred there: yet, the moment that any of those lose the living principle, they become subject to the digestive powers of the stomach." Other theories have been advanced to explain the facts in the case, but all are unsatisfactory. Dr. J. W. Warren contributes an article to the *Boston medical and surgical journal*, in

which he reviews the evidence presented by those who have maintained these several theories, and gives the results of some twenty experiments of his own made on fifty frogs. He suspended the legs of the frogs while living in an artificial gastric juice (that is, pepsin and hydrochloric acid), and found that the muscular tissue was digested, as was shown by the presence of peptone, the frog remaining alive throughout the experiment. When acid alone was used without the pepsin, the muscle was softened and dissolved, but not peptonized, and therefore not digested. It thus appears that living tissues may be digested, and that the problem is as far from solution as ever. Dr. Warren comes to the same conclusion, but promises to investigate the subject more fully in the future.

IN A RECENT NUMBER of *Science* we referred to the experiments of Dr. T. M. Prudden on bacteria in water, with special reference to the ice-supply of New York City. These experiments were not confined to the water, but included also the ice itself. These observations show that ice formed in the Hudson River near Albany contains vastly greater numbers of bacteria than that found at some distance below, but that, notwithstanding the fact that the water of the river is freed to a certain degree from bacteria after running some distance, the average number of bacteria left in the ice is considerably above that which can be regarded as wholly safe. Samples of ice from the various lakes and ponds from which the supply of New York is taken have also been analyzed. The general conclusions to which Dr. Prudden has arrived may be thus summarized: 1°. A biological analysis of water and ice will detect the presence of bacteria, some species of which can give rise to serious disease, but a great deal of careful study of other conditions is still necessary in order to determine whether the water or ice is suitable for use or not; 2°. In freezing, water purifies itself only partially, the gross particles and some of the materials in solution being removed, but the bacteria remain to a considerable extent unaffected; 3°. Different species of bacteria possess differing degrees of vulnerability to the action of low temperatures; 4°. The bacillus of typhoid-fever and the common bacteria of suppuration are capable of resisting a prolonged exposure to a low temperature with the destruction of a part only of the individuals thus exposed; 5°. Experimental data justify the belief that in natural waters there may be a purification of about ninety per cent; 6°. In filtration of water the various species of bacteria, dangerous and harmless, are eliminated with about equal efficiency, while in freezing the dangerous disease-producing species may be retained if they resist low temperatures, while more or less of the harmless forms may be destroyed; 7°. The ice supplied to New York comes from a series of naturally excellent lakes and ponds, and from a great tidal river largely contaminated in its upper regions, and by far the larger proportion of the ice comes from the latter source; 8°. A very much greater number of bacteria are found in snow-ice and in the very bubbly streaks than in the transparent ice, particularly in the snow-ice on the top of the cakes; 9°. The average number of bacteria in ice from all sources taken together is far beyond the general standard which even a moderate degree of purity would allow; 10°. The transparent ice from some of the lake and pond sources presents in general a most admirable degree of freedom from bacteria.

In interpreting the results which he has reached, Dr. Prudden states that typhoid-fever, and diseases associated with acute suppuration and the so-called blood-poisoning from wounds, or pyaemia, are almost constantly present in large towns like Troy and Albany, and frequently so in villages like many of those which lie along the upper Hudson; and that his experiments have shown that the bacteria causing these two forms of disease are markedly resistant to the temperature at which ice forms. He estimates that in Albany alone, there are, on an average, fifty cases of typhoid-fever whose excreta pass into the Hudson River each year during the ice-forming season. He also finds that in that city there is no systematic disinfection of the typhoid discharges, which therefore enter the sewers, and subsequently the river, with their myriads of bacteria in a living condition. Dr. Prudden recommends that the state board of health, or other authority, shall have full control of the ice-harvesting fields, and determine which, if any, of the sources of ice-supply are so situated as to imperil the health of the consumers of the ice. In addition to this, a compulsory system of disinfection of excreta in infectious diseases should be instituted. He also thinks that artificial ice might, perhaps, be substituted for the natural ice. In concluding his very valuable paper, the writer expresses his sincere hope that his

study and conclusions may not be looked upon in a sensational light, nor regarded as a polemic against ice companies and dealers, or against the free and wonted use of ice, the incalculable usefulness of which is beyond question. His researches have been carried out at great expenditure of time and money, in the hope, that, in the light of its results, the rapidly developing discipline of preventive medicine might find a plan of curtailing, in some degree, the number of annual victims to preventible disease.

WHEN THE STUDENT is translating from a foreign language, especially from the classics, the teacher is very apt to measure the quality of the performance by the literalness of the translation. Every preposition, every interjection, every case or tense signification, must find verbal expression in English, no matter at what sacrifice of sense and spirit. But translation is not the same thing as transliteration. The student's aim should not be to get the Greek or Latin words into English, but to convey the sense and spirit of the writer. We are convinced that this is one of the most prominent faults in the classical instruction of the present. And it does not end in the mere use of language. It has a narrowing, cramping influence on the mind, instead of developing that breadth of view and comprehension which ought to come from classical study. It is surprising, too, how great an influence for evil this ultra-literal translation has on the student's English style. We have known numerous instances where the peculiarly Greek and Latin idioms have been quite as numerous in a composition or essay as the English. The result is, naturally enough, a forced, artificial, and awkward style. Our classical teachers, especially those who have the supervision of the younger pupils, cannot be too careful in demanding a translation which shall not neglect the spirit while it interprets the letter of the author.

THE REPORT OF THE SPECIAL COMMITTEE of the American public health association on the disinfection of rags contains a complete summary of all the evidence which has thus far been accumulated, in this country and Europe, in reference to this article of commerce, and the dangers connected with it. The greater part of the report was submitted at the Toronto meeting of the association. A letter from Dr. Sternberg to one of the members of the committee, giving the results of his investigations abroad, has been appended to the report. In it Dr. Sternberg says he made inspections at Ghent, Brussels, Berlin, and Stettin, and obtained reliable information as to the methods pursued in Hamburg and other German ports from which rags are shipped to this country. He had previously supposed that rags from ports in southern Europe, where cholera was prevalent, were liable to be shipped from any of these ports; but he was assured that this could never occur, on account of the low price of rags as compared with the cost of land transportation. As a matter of fact, rags sent to each shipping-port can only be collected within a limited area, the boundaries of which depend upon cheap transportation facilities by canals, rivers, etc. He regards it as incumbent upon all sanitarians to insist upon the proper protection of all those who are brought by their occupation in contact with old rags. If this is done, the danger will be reduced to a minimum; and if the community is fully protected in the same way as is the case in Germany, there will be no good reason for disinfecting rags in the bale. He considers it as desirable that all old rags should be disinfected by steam, and dried, before being baled. During the prevalence of cholera, all old rags from ports known to be infected, or in direct communication with infected places, should be excluded. He would require all rags shipped from a healthy port during the prevalence of cholera in Europe to be disinfected by steam before being baled for shipment. In the absence of any prevailing epidemic, baled rags should be treated as other merchandise. If any merchandise is dangerous, it should be disinfected, and this can be done most effectually by steam.

THE EPIDEMIC OF SCARLET-FEVER attributed to the milk of a sick cow, to which we referred in a recent number of *Science*, has been still further investigated by Dr. Klein, for the British government. A micrococcus was obtained from the ulcers of the sick cow, which, when inoculated into calves, produced the same lesions as existed in the cow from which they were taken. Dr. Klein has found in the blood of scarlet-fever patients a micrococcus which appears to be identical with that obtained from the cow. He has inoculated and fed mice with the micrococci from these two sources, and the same results have been produced. He has also obtained the same micrococci from the blood of these mice, and cultivated them. The same inoculations have been made

upon calves, with the same results. If these observations are confirmed by further experiments and other experimenters, the micro-organism which has been so long undiscovered, and which causes tens of thousands of deaths annually, may soon be added to the list which now contains that of tuberculosis, typhoid-fever, and a few other diseases.

THE AMERICAN SCHOOL OF CLASSICAL STUDIES AT ATHENS.

The opportunity which is just now presented to the managers of the American school at Athens to secure an efficient, permanent director, brings the claims of this useful enterprise with fresh strength before the scholars and promoters of learning in America. Dr. Charles Waldstein, the accomplished archeologist, who is a citizen of New York and a former student of Columbia college, but who now holds two important positions at the University of Cambridge, England, as lecturer on archeology and director of the Fitzwilliam museum, has accepted the invitation of the managers to assume the directorship, upon the condition that a permanent endowment shall be secured for the school, sufficient for its legitimate needs, before the 1st of October, 1888, when the appointed year of Professor Merriam of Columbia college will end. A writer in the London *Saturday review* for Sept. 26, 1885, gives an intelligent and highly appreciative account of the work done by the American school, but makes this forcible criticism: "Undoubtedly the weak point of the whole American scheme is the fact that the director goes out for a year only. America can send a succession of good scholars, but she cannot send a succession of men capable of teaching archeology; indeed, a student who remains at Athens longer than the regulation year might easily become more learned in that pursuit than his director. Thus the head of the school cannot instruct his students, but only work with them, and they must pick up their knowledge from books as well as they can."

The American school of classical studies was projected by the Archeological institute of America (of which Prof. Charles Eliot Norton is the president), and was organized under the auspices of some of the leading American colleges. The director of the school was to be chosen from the professors of Greek in these colleges, by a committee appointed by the Archeological institute. The school was opened on the 2d of October, 1882, under Prof. W. W. Goodwin of Harvard university. Its object was to furnish to graduates of American colleges an opportunity to study classical literature, art, and antiquities in Athens under suitable direction; to prosecute and to aid original research in these subjects; and to co-operate with the home institute, so far as possible, in conducting the exploration and excavation of classic sites. The salary of the director was to be paid by his own college, and no fees were to be charged to the students. The boldness of this enterprise was peculiarly American, for, while the older French and German schools had been maintained for many years by the liberality of the two governments that founded them, the projectors of the American school relied with confidence upon the willingness, and even eagerness, of our intelligent men of wealth to take the place which ancient governments fill in Europe, as patrons of learning.

The American undertaking instantly presented a stimulus in the same direction to English scholars; and within three years we find Dr. Lightfoot, the bishop of Durham, urging his countrymen to emulate our example in establishing a school at Athens. He said at a public meeting in London, in 1885, "It now touches our honor as Englishmen very nearly that this scheme should be carried out without delay. France and Germany have long been in the field. France has her school, and Germany her institute; and even America has forestalled her in this race. That new country, notwithstanding the vast and absorbing interests of the present, notwithstanding the boundless hopes of the future, has been eager to claim her part in the heritage. While all the civilized nations of the world, one after another, are establishing their literary consulates in Athens, shall England alone be unrepresented at this centre of Hellenic culture?"

These words, supported by the earnest appeals of Dr. Hornby, provost of Eton, Prof. R. C. Jebb, and other distinguished scholars, produced the desired effect, and a British school is now established in Athens.

The American school has now nearly completed its fifth year of work, with increased numbers of students and every prospect of increasing usefulness. It has up to this time occupied a hired house, and has been entirely supported by the annual contributions of fourteen colleges, from which the house-rent, the appropriations for the library, and incidental expenses, have been paid; each college, in its turn, sending a professor to Athens as director for one year without expense to the school. With these temporary and imperfect arrangements, much valuable work has been accomplished by the school, which has received cordial recognition both at home and abroad. "Now," as the managers say, "a new era is to begin. We are henceforth to have a home of our